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THE PENINSULA OF YUCATAN

BY

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The flat peninsula of Yucatan, projecting northward like a thumb at the southern entrance of the Gulf of Mexico, is full of problems for the geographer. Some of these, such as the numerous "cenotes," or caverns which contain the only natural sources of permanent water, have been well described in the *Bulletin* and elsewhere. Others, such as the peculiar "storms" of minute earthquakes which at times shake the peninsula for days, are not yet understood nor are they widely known. And still others, such as the cause of the location in this region of the highest civilization which ever developed in America before the coming of Columbus, have been discussed for years, but have never been satisfactorily explained. A visit of two weeks to the peninsula during a journey to Mexico, on behalf of the Carnegie Institution of Washington in the spring of 1912, introduced the author to some of the chief problems, and has led him to write this paper for the purpose of briefly calling attention to them, without trying to describe the country as a whole, or to enter into elaborate discussions.

The position of Yucatan with respect to the rest of the world is highly isolated. Toward the south and east it is bounded by dense tropical forests which even in our day are penetrated neither by railway nor road. They can be traversed only along Indian trails, winding and crooked, and often coming blindly to an end. Even these poor apologies for paths are impassable except with the help of a party of natives armed with big machetes for cutting the young trees

and lianas, which grow with astounding rapidity. The inhabitants of the forests are limited to a few scattered bands of Indians in the lowest stages of civilization. Often the traveler may go for days without seeing a village or even a camp. On the north, east and west Yucatan is surrounded by water, but that does not make it accessible. The harbors on the east coast are said to be fairly good, but the country back of them is covered with dense forests like those on the south, and hence they are almost useless as means of getting at the important portions of the country. On the north the coast is

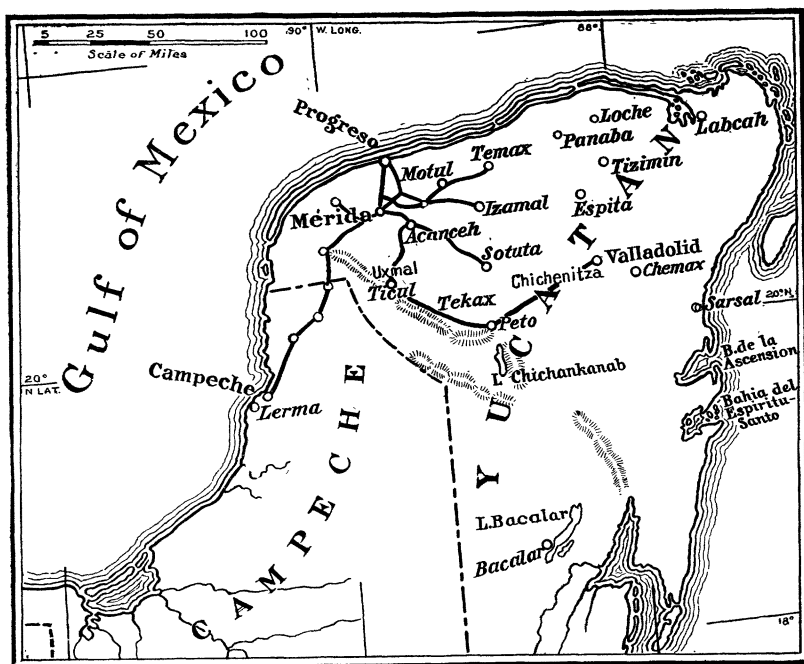


FIG. 1.—Yucatan.

bordered by an almost continuous line of sand bars and lagoons. Within the lagoons the water is quiet and small boats can sail easily, but unfortunately it is not possible to go any great distance without meeting barriers which force the navigator to take to the open sea. There the waves raised by the prevailing trade winds blowing freshly from the northeast are so high as to make long voyages too dangerous to be commonly undertaken. As far as modern steamers are concerned conditions are no better. Like all newly uplifted coastal plains Yucatan is bordered by very shallow seas. The steamers of

the Ward Line, the only one plying regularly to the country, are forced to anchor three miles or more from land, and to send their freight and passengers ashore in a tug which pitches most disquietingly even in comparatively good weather. In bad weather it is often impossible to make a landing. On the west coast, known as Campeche, conditions are somewhat better because of less exposure to the winds, but the difficulties due to shallow water are not much different. Altogether the peninsula of Yucatan is a decidedly inaccessible region. No great trade routes touch it, its near neighbors



FIG. 2—The mouth of a "cenote."

on every side are backward, and there is little in its geographical position or in its degree of accessibility to permit of the stimulation which comes by contact with people of other ideas and habits.

Physiographically, as has already been implied, the northern part of Yucatan is a coastal plain newly uplifted from the sea. For scores of miles the general aspect of the country is absolutely flat. Near the center, low hills rise to a height of 300 or 400 feet, and farther south the relief becomes greater. The most noticeable ridge, so far as the inhabited portions of the country are concerned,

runs southwestward from a point about thirty miles inland from the northwestern corner of the peninsula. Its rounded hills are a prominent feature in the landscape as looked at from the plain to the east, but they are nowhere difficult to cross. Nevertheless they form a genuine barrier to civilization, largely because of their relation to water-supply, rainfall and vegetation.

Practically all of Yucatan is composed of soluble limestone. This has given rise to one of the most widely known features of the country, that is its underground drainage and "cenotes" or caves. The topography is almost universally of the type known as "karst." The karst, however, is not of the kind most commonly known, for in Yucatan we have to deal with a level plain instead of with a region of considerable relief. Because of the flatness of the country and the porous nature of the soluble limestone such a thing as a river is unknown. Not even a brook is found in the whole region, and naturally there are no valleys either. The only break in the flat monotony is afforded by innumerable little hillocks five to fifteen feet high. They lie in no regular order, being merely the remnants which happen to have been left between depressions in which a little water gathers in the rainy season. The water stands in pools for a while, and by so doing tends to dissolve the hollows to a deeper level. Only rarely does the water of one hollow run over into another, and even then not in sufficient amounts to make real running streams. Such being the case, the drainage of the country is naturally confined to underground channels. Often the concealed waters dissolve large caves, whose tops sometimes have fallen in, exposing the water at a depth of anywhere from twenty to a hundred feet, and thus giving rise to the "cenotes." These broken-down caves are of great importance to the inhabitants, for, as has already been said, they are the only places where a permanent supply of water is obtainable naturally throughout the year. At the time of the coming of the Spaniards all the native inhabitants, the Maya Indians, are said to have been clustered around them. Having no iron tools the primitive Mayas were unable to dig wells. To-day wells can be dug almost everywhere with full assurance of striking an abundant and unfailling supply of water. The only difficulty is that in the hilly regions the wells have to be sunk to a depth of from 100 to 200 feet, and the labor involved is sufficient in many cases to prevent the inefficient people of the tropics from making the attempt. Where ground water lies at a depth of only twenty or thirty feet, as in most parts of the plain, wells are numerous. In many cases the water is

raised by windmills which seem to rise like a forest when one looks from a distance at such a town as Merida, the capital. During recent years, when Yucatan has grown rich from the henequen or sisal fiber industry, pumps run by gasoline or steam have in many places appeared.

Climatically, as well as in other ways, Yucatan is relatively simple. It lies in the trade wind belt from about $18^{\circ}10'$ to $21^{\circ}30'$ N. In winter the brisk winds from the ocean pass over the land without giving up much moisture. The sky is clear a large part of the time, and although some rain falls in every month the amount in the northern parts is insignificant. Farther south, however, where the hills begin to rise, the rainfall increases rapidly, and showers are quite frequent even in the dry season. The temperature in winter is agreeable, being rarely extremely warm and never cold according to the ideas of people from the north. There is, however, considerable variety, especially when the so-called northers blow. These appear to be connected with the cyclonic storms of the United States. The winds blow violently from the north and reduce the temperature to the lowest points ever reached. The minimum, however, is rarely below 10° C. (50° F.), while the maximum, even in winter is usually above 30° C. (86° F.), and may rise above 40° C. by the end of March. In summer, as might be expected in this latitude, the maximum temperature is scarcely higher than in winter, although the minimum does not fall so low. The zone of subtropical rains exerts its accustomed influence and gives rise to heavy tropical showers. How greatly the summer rainfall exceeds that of winter may be seen from the accompanying table which gives the average monthly rainfall for the 15 years from 1896 to 1910 inclusive at Merida:

MONTH	RAINFALL IN INCHES	MONTH	RAINFALL IN INCHES
January	0.88	August	8.48
February	0.68	September	4.46
March	0.58	October	3.04
April	0.74	November	1.94
May	1.70	December	1.36
June	5.61		—
July	4.90	Total	34.37

The seasonal variation of rainfall is no more striking than its variation from region to region. In the north the rainfall is slight, being at a minimum on the coast in the neighborhood of Progreso. Here in 1911, the only year for which statistics are at hand, the precipitation amounted to 13.5 inches. From 15 to 20 miles inland, at

such places as Merida, or Motul and Temax (Temásh), which lie farther east, the precipitation for the same year was 35.7, 37.6, and 34.8 inches respectively. Still farther inland at places varying from thirty to ninety miles from the coast the figures are: Izamal, forty miles due east of Merida 49.2 inches, Espita, nearly as much again to the east 48.7 inches, Tekax, fifty miles south-south-east of Merida 53.3 inches, and Peto about thirty miles southeast of Tekax, but not so close to the hills, 47.7 inches. Finally to the east and south of the places already mentioned we find an area of still larger rainfall, exemplified by Valladolid, which lies a hundred miles east-southeast



FIG. 3—An Indian hut on the edge of the jungle.

of Merida and about fifty miles from the Caribbean Sea, and had a rainfall of 66.8 inches in 1911. Beyond this point, to judge from the vegetation, the precipitation becomes still greater. The cause for the variation in rainfall is two-fold. In the first place the presence of hills in the south and southwest on the one hand, and the proximity of the east coast to the open Caribbean Sea with its moist east winds, on the other, give those regions more rain than has the north coast and northern interior. In the second place we are here

near the edge of the area reached by the zone of subequatorial rains. Hence the amount of these rains increases rapidly toward the equator.

With such marked changes in the amount of rainfall from place to place, it is evident that the vegetation must vary greatly, and this in turn must profoundly affect the conditions of human life. In works on botany it is common to emphasize the distinction between

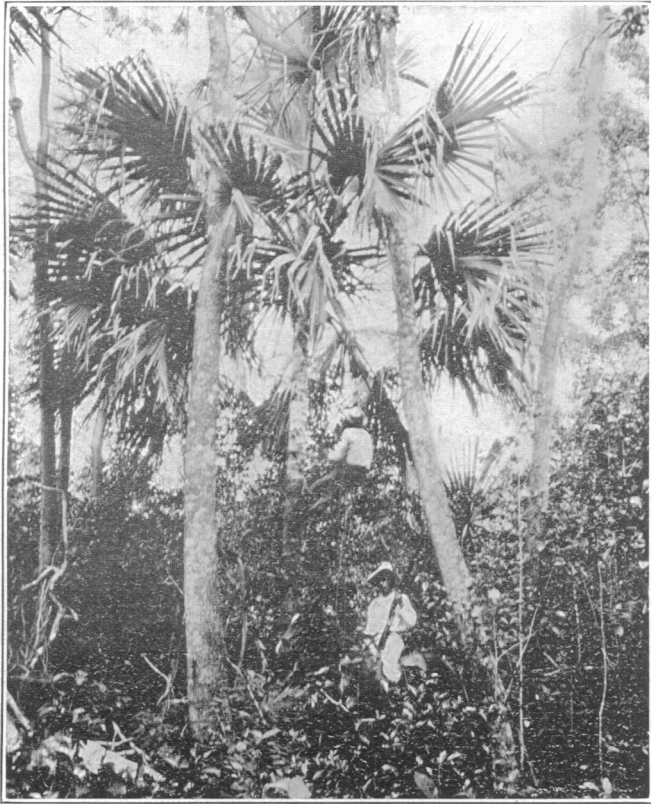


FIG. 4—The tropical forest.

tropical jungle and tropical forest. Nevertheless in the mind of the average geographer, if I may judge from my own experience, and still more in the mind of the layman, the distinction between the two often lacks sharpness. There is a still greater lack of appreciation of the significance of the two in reference to man. In Yucatan jungle and forest lie close together in such a fashion that they can

readily be compared. In the center of Yucatan lies a long narrow lake called Chichankanab, one of several which occupy hollows in the limestone of the southerly, more hilly portion of the peninsula. It is about a hundred miles east of Campeche, a hundred west of the Caribbean Sea, and a hundred south of the northern shore of the peninsula. If lines be drawn northeastward and northwestward from the lake to the corners of the peninsula they will include approximately the entire area of the Mexican administrative province of Yucatan, comprising about one-fifth of the whole peninsula. This small area, together with a strip of the west coast reaching down toward Campeche, comprises the jungle-covered portion, while the rest is covered with genuine tropical forest. The western boundary of Yucatan proper is nearly coincident with the small range of hills already mentioned as the most noticeable feature of the relief. The eastern boundary appears to be less distinct, although I have not seen it and cannot speak with assurance. Where jungle prevails the rainfall seems not to exceed fifty inches, while in the forested area it rises far higher. How great it is we do not know, for Valladolid, with nearly 67 inches in 1911, is the only station whose figures I can find, and it lies on the relatively dry edge of the forest, not in its moist interior.

The distinction between jungle and forest is simple. Large trees demand that the soil in which they stand shall not be dry for any great length of time during the growing season. Inasmuch as the growing season lasts almost the entire year in the tropics, large trees will not flourish in such a way as to form dense forests unless abundant rain falls at most seasons, although they may grow sporadically here and there. Smaller, more drought-resistant species, however, as well as bushes, are much less exacting in their demands for moisture. Some of them will grow almost anywhere if the ground is well moistened for two or three months during some portion of the year. In regions like Progreso, where the rainfall is only from ten to fifteen inches and is concentrated largely in the summer, the long dry period of winter prevents the growth of anything except small bushes six or eight feet high. These, however, thrive in abundance so that the country is well covered with vegetation and is everywhere bright green in summer. In the dry winter, however, the leaves fall off and the landscape would be quite like that of a thick bushy pasture in the United States were it not that in March or April some of the bushes bear brilliant red, yellow or white flowers. As one goes inland from the north coast to regions of greater rain-

fall the size of the bushes gradually increases and small trees appear. Even at the southern limit of jungle, however, at places like Tekax and Peto the diminutive limestone hillocks or the larger hills of the range bordering the administrative province of Yucatan are covered with a low scrubby growth. Some trees rise thirty or forty feet, and many twenty feet. There is nothing, however, to suggest the deep, somber forest. Small growths not over twenty feet high and with stems only three or four inches in diameter predominate. The aspect is like that of a second growth of timber in the northern United States fifteen or twenty years after the cutting of the original forest. A few bushes and even an occasional tree of some special species may remain green throughout the year, but most become as bare as northern trees.

From the jungle to the forest the transition is rapid. A day's ride on horseback is sometimes sufficient to take one from a well developed sample of one to an almost equally well developed sample of the other. The forest is of the kind whose descriptions are so familiar. Many trees remain green throughout the year. The trunks rise to heights of fifty or sixty feet even on the borders of their province, and at the top the leaves form a canopy so that the ground is usually shady. Until 9 or 10 A. M., the rays of the sun, even in the drier months when a portion of the leaves have fallen, scarcely reach the ground. Even at high noon the sunlight straggles through only in small patches. Long, sinuous lianas, often queerly braided, hang down from the trees; epiphytes and various other parasitic growths add their strange greens and reds to the varied complex of plants. Young palms grow up almost in a night, and block a trail which was passable a few days before. Wherever the death of old trees forms an opening, hundreds of seedlings begin a fierce race to reach the light and strangle their competitors. Everywhere the dominant note is intensely vigorous life, rapid growth, and quick decay, as befits the warm moist air which rarely varies and never is so cold or dry as seriously to interfere with the development of the most sensitive types of plants.

Before discussing the effect of the vegetation and of other conditions on man, a word as to the relation of the karst to the vegetation. It is sometimes stated that the paucity, or rather the small size and xerophilous character of the vegetation of northern Yucatan is largely due to the dryness of the soil occasioned by the draining away of the water through the caves and underground channels. Undoubtedly this is an important factor, but I doubt whether it is so im-

portant as the rainfall. In no country where the growing season is at all warm can a rainfall of ten or fifteen inches support anything except a xerophilous type of vegetation. In a country so warm as Yucatan thirty or forty inches is by no means a large rainfall, and even if none of it were lost in the karst the country would still be relatively dry because of the great evaporation and long dry season from November or December to May. In the southern half of Yucatan not only on the edges but actually within the limits of the genuine forest, karst phenomena seem to be as marked as near



FIG. 5.—A house in a Yucatan village.

the northern coast, but this does not prevent the growth of the rankest kind of vegetation. It seems, therefore, that while the karsted character of the country plays a part in limiting the growth of vegetation, it is by no means so important as the relatively small amount of precipitation.

The people of Yucatan consist of every gradation from pure Indians to pure Spaniards. The forests and the remoter villages are occupied by Indians of the Maya stock; the small towns and the less remote villages are peopled by a mixed race of Mestizoes in

which the Indian element predominates, while in the larger towns and their environs the proportion of Spanish blood steadily rises. The degree of energy and initiative is almost directly in proportion to the amount of Spanish blood. The pure Indian is a quiet, slow being, inoffensive and retiring unless abused. He never seems to work unless compelled. As for storing up anything for the future, the thought seems never to enter his head. If he has enough to eat, he simply sits still and enjoys life until hunger again arouses him to activity. His wants are few and easily supplied. His agriculture



FIG. 6—An Indian seated beside the sleeping platform at his cornfield. Pumpkins on the right and corn cobs on the left.

begins by cutting the smaller trees of the jungle, girdling the few larger ones, leaving the brush to dry during the season of little rain, and finally burning it off. Then, with a pointed stick he makes holes into which he drops corn, beans, and the seeds of the pumpkin, or of one or two other vegetables. The corn is his chief reliance. When the crop is ripe, he never thinks of gathering it all at once, or of storing it away safely, perhaps in the form of flour. His method is to go out to the field in the early part of the dry season after the corn is well ripe, and bend down each stalk so that the ears point

downward and shed the occasional rains. Of course he uses what corn he needs day by day, and his wife grinds a little each morning for the day's tortillas, but beyond this he attempts little. Week by week he picks what ears he needs, caring nothing that insects, birds and beasts are eating what they need also. He knows that a quarter or a third of the ears may be spoiled, but so long as some are left, he cares little. The only thing that ultimately stirs him up to gather the remainder of the crop is the end of the dry season. Before the rains come he knows that he must burn over his field and plant more seed or else he will starve. Therefore he arouses himself for a period of effort at least once during the year. He is hardly to be blamed for his apparent laziness. He certainly is lazy according to our standards, but he has little to stimulate him, and it is easy to get a living without much work. In good qualities, however, he is by no means lacking. He is extremely courteous, and according to all accounts he excels in both honesty and morality.

As the amount of Spanish blood in the people of Yucatan increases, their energy and resourcefulness also increase. They also become more light-hearted and gay than the silent, sober Indians, but at the same time the degree of honesty and morality is said to decrease markedly. All classes of people are slow compared to Americans. During two weeks in Yucatan the only persons whom I remember to have seen running were Mr. E. H. Thompson, for many years United States Consul, and myself. Landing in New York, without having seen any other country in the interim, I confess to having felt almost bewildered by the rush. It was between five and six o'clock in the evening, and by comparison with Yucatan it seemed as if at that hour when people were hastening homeward, about one in ten actually ran. Even though I had been away but seven weeks I had to make a distinct effort to keep up with the crowd, although in Yucatan I had walked faster than almost anyone else. In this connection a fact as to the Spaniards is worth recording. In Yucatan, as well as in other parts of Mexico there is a surprisingly large number of recent Spanish immigrants. According to the almost universal testimony of the numerous people with whom I talked, these immigrants are better workers than the corresponding class of natives, no matter whether the natives are Indians, Mestizoes, or Spaniards who have been in the country a generation or two. Something in the new environment seems to make people slow. In part, this may be due to contact with an inferior race, but more probably it is a matter of climate. Possibly the heat has something

to do with it, but there seems ground for believing that it is the uniformity of the temperature quite as much as its degree. Almost everyone agrees that the natives work hardest on "fresh" days, which may be either because the temperature is lower, or because there has been a sudden change. When I asked Mr. Thompson about the matter he gave the same testimony as others. Then he went out and asked some of his old Indian friends about it. They agreed with the others, but added, "People work hardest the morning after a norther, after the wind has ceased, and while it is cool. On such days the women bake the tortillas much more quickly than usual, and we get away to work early." The men have to wait each morning until the women grind some flour and bake the universal thin cakes of corn meal known as tortillas. Hence the husbands are apt to take special notice of the days when the tortillas are ready early. Perhaps if Yucatan had a norther every three days instead of only at rare intervals the tortillas might even be baked the evening before.

The human inhabitants of Yucatan are distributed very unequally. Practically all of the 400,000 people of the peninsula live in the jungle region of Yucatan proper and the coastal strip north of Campeche, an area smaller than that of Massachusetts. The rest of the country, comprising most of the province of Campeche and the Federal District known as Quintana Roo, contains only a few wild Indians estimated at 4,000 or 5,000 in number. The reason is not far to seek; the tropical forest has hitherto proved unconquerable. I want to emphasize this matter a little, for it seems to be more important than is generally realized. Descriptions of tropical forests are usually couched in such indefinite terms that it is hard to tell whether a given area in its pristine condition would be covered with jungle or forest. So far as I can ascertain, however, practically all of the tropical regions where the natives have risen to such a state of relative civilization that they live permanently in good-sized villages and depend primarily upon agriculture for a living are located where the prevalent natural growth is of the type which we have defined as jungle. In such a region it is possible for people possessed of even the moderate efficiency of the tropics to get a living by agriculture. The small trees or bushes with a diameter of five inches or less may readily be hacked down with almost any kind of heavy knife; while the occasional larger ones may be girdled by cutting off the bark near the base, and will soon die. If this is done during the earlier part of the dry season, which is characteristic of all tropical regions where jungle prevails, the bushes and perhaps

some of the girdled trees will be dry enough to burn before the rains come again. Hence it is a comparatively simple matter to clear a tract and plant it; moreover, if some of the few larger trees remain standing no harm is done.

In the true forest the case is quite different. In the first place the trees are large, the majority having trunks at least a foot in diameter and many of them much more. Moreover, they are chiefly species whose wood is hard. Hence it is difficult to cut them down. Only persons of great energy are capable of doing much of it. If



FIG. 7—A well in an Indian village.

the easier process of girdling is employed, the trees will die in course of time, and it would seem as though even the inefficient people of the tropics might thus clear large areas. Unfortunately another difficulty arises, which is serious where the trees are actually cut, and more so where they are girdled. The climate of the true tropical forests is so uniformly moist that even when trees have been felled, it takes a long time for them to become dry enough to burn. While they are drying, however, new vegetation begins to sprout, and by the time the trees are ready to burn the new growth is so

large that it prevents the fire from spreading from tree to tree. That this is so is evident from the fact that even in the jungle region the fires which are lighted every year in the spring to burn off the corn stalks appear practically never to spread any great distance into the uncut jungle. The rapid growth of plants in the tropics is far greater than we commonly realize. One day as I was riding on the southern edge of the jungle, near the forest but well out of it, my guide remarked that the land over which we were passing had been cultivated three years before. Already the bushes were fifteen feet

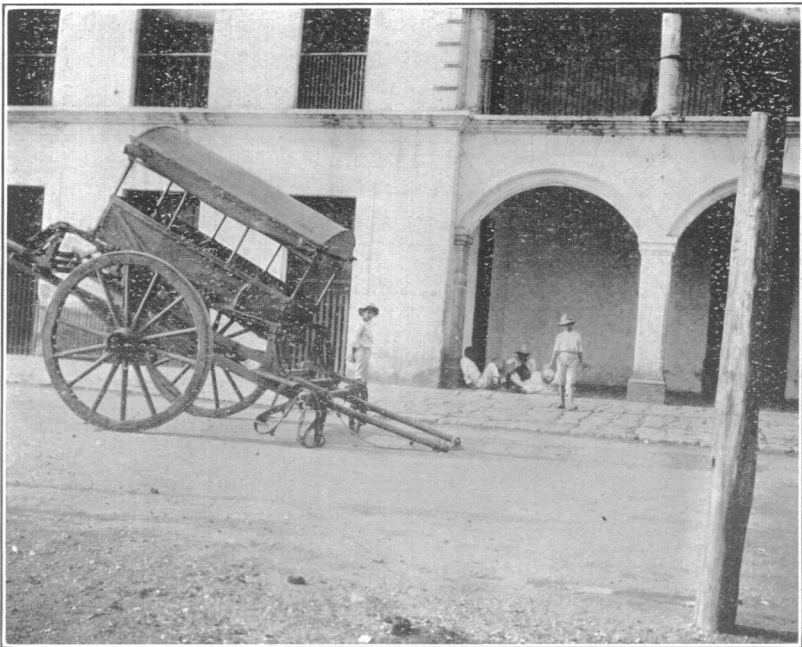


FIG. 8—A “volon” or carriage suspended on straps at a sugar estate in Yucatan. The roads are so rocky that carriages with ordinary springs cannot be used.

high. In the heart of the forest the growth is even faster. Hence the very rankness of the growth of plants is one of the primary reasons why man has never yet really mastered any considerable area where genuine tropical forests prevail.

Other reasons for this also exist. For example, in the forest it is well known that malarial fevers are much worse than in the drier jungle. The natives are said to be immune to such fevers, but modern research throws doubt on this. The adults are immune, but

how about the children? The researches of Sir Ronald Ross and of the Tropical School of Medicine at Liverpool have shown that in Greece, for instance, adults do not suffer much from malaria, but that at least half of the children have it badly during childhood and a large number bear its marks through life in the form of enlarged spleens and other injurious alterations of the organs. Every generation is apparently distinctly weakened by the diseases through which it passes in childhood. Similarly, in places such as Merida, where yellow fever is endemic, it is said that the natives never suffer, and that epidemics break out only when newcomers arrive from outside. Many physicians now think, however, that many of the children have the fever in infancy. Those who die are supposed to have suffered from other infant complaints, while those who recover are of course immune. In the case of yellow fever the after effects are generally not serious, but in the case of malarial fevers, especially the worse forms such as prevail in the tropics, the debilitating results often last through life. Thus it may be that the severe fevers of the forests, attacking the children and killing many of them, leave the remainder permanently weakened and incapacitated for the work of forwarding civilization in their hard surroundings.

So far as the indirect effects of climate upon human character are concerned there seems to be a curious contradiction between tropical and non-tropical regions. In the one case a relative lack of rain seems to be beneficial, while in the other it is in general detrimental. At least we seem to be safe in saying that the most progressive parts of the tropics are comparatively dry, while the most progressive countries of the temperate zone are usually in regions of comparative moisture. Aridity in the tropics is more favorable than moisture partly because the period for which man must make provision in order to tide over the months when no wild food can be obtained is much longer than in the moister regions. Where rain is sufficiently abundant, tropical fruits of some kind ripen at almost all seasons, and wild animals exist in great profusion. In the drier regions, that is where jungle prevails, fruits and seeds ripen chiefly at particular seasons determined by the advent of the rainy season. Moreover, the number of wild animals and birds is less than in the forests, and thus the supply of food is relatively deficient. This seems to force the man who would live, or who is obliged to live in the jungle to make provision for his needs beforehand, a necessity which must be of great value in developing him mentally. Or rather the portion of the community which is not brainy enough to make provision for the

future is in danger of starving, and is gradually eliminated by the weakness and disease arising from its own improvidence. To be sure, the mental stimulus and selection due to relatively arid conditions in the tropics is very small compared with that arising from climatic conditions farther north, but nevertheless it is important.

One evidence of relatively high civilization in Yucatan is the cleanliness of the inhabitants. Not only is Merida, with its beautifully asphalted streets, one of the cleanest cities in the world, but the people themselves are extraordinarily clean. They are more completely and universally clothed than most tropical peoples, and their clothes, which are almost universally white, are kept immaculate by daily washing. The common custom is to take a bath and put on clean clothes at the end of the day's work, and then to wear the clean clothes the next day. Even the poor little newsboys come out each morning in undershirts and drawers which may be ragged but are always freshly washed. The dress of the ordinary men is no more than that of the boys, save that a sort of apron, like a towel, striped in pale blue, is wound around the waist and falls to the knees. The upper classes wear European dress, but white clothes greatly predominate, and are always clean. So common is cleanliness that one of the chief sources of matrimonial difficulties is said to be the failure of the wife to have the tepid water ready for her husband's bath on his return from work.

In the matter of cleanliness two other nations may be put in the same class with the Yucatecos, although it is doubtful whether they rival them. These are the Malays and the Japanese. In certain other countries, such as Cuba and the Philippines, the houses and streets may be dirty, but there is a high degree of personal cleanliness. So, too, in India the upper classes, the Brahmins and others, are notable for the amount of washing that they do. Outside of the tropics it is doubtful whether any nation is so generally clean in person as are those that have just been mentioned. The English boast of their cold tubs, but these are the luxury of the rich, not the everyday necessity of the poor. A crowd of English laborers under ordinary circumstances would seem to the Yucatecos very dirty and odoriferous. The reason for the cleanliness of these people seems to be their climate. They and the other races who are noted for their proneness to bathe live in regions where the atmosphere is practically always warm and where the rains fall heavily during the summer season, making the air extremely humid. If a nation begins to rise in the scale of civilization and adopts the practice of

wearing clothes all the time, it is essential that the custom of bathing become common. The savages who go naked never need a bath, but the civilized people who wear clothes must wash both themselves and their clothes or else the perspiration which cannot evaporate into the moist air will soon render their skins and their clothing unendurably foul. Not only will they become obnoxious to themselves and to others, but they will be liable, apparently, to disease. Thus it would appear that the part of a community which dwells in a hot, damp climate and attempts to wear clothing but does not bathe will

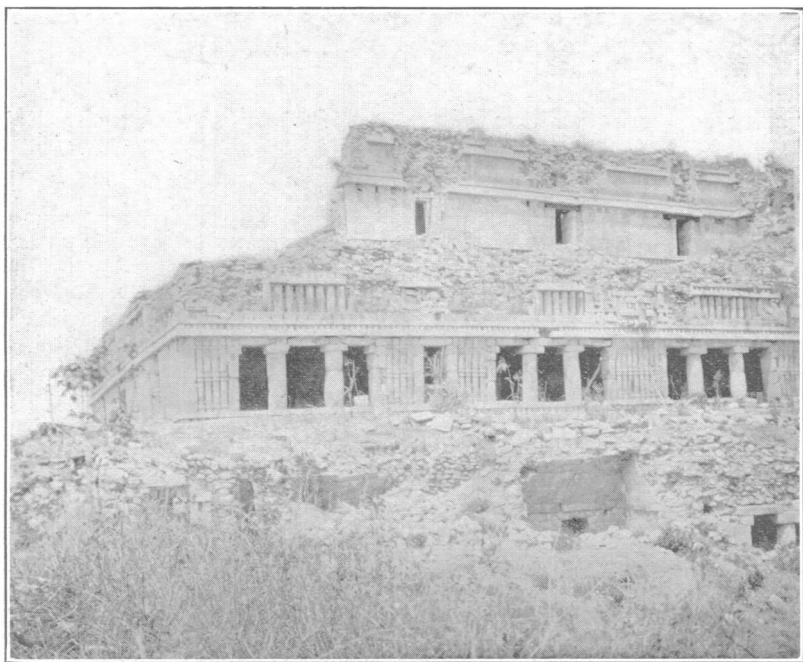


FIG. 9.—Ruins of the temple of Sayi.

gradually tend to be eliminated by disease. Those who remain will have thoroughly learned the habit of cleanliness. The extreme excellence of the Yucatecos in this respect may be due to the fact that the Maya Indians have lived so long, for unknown milleniums perhaps, in the same environment. The newcomers who have invaded the country from Europe have followed the example of the natives in part, but “dirty as a Spaniard” is still a common saying. How far cleanliness is associated with other virtues such as strict sexual

morality it is hard to say, but it seems as if there must be some connection.

Among all the problems of Yucatan, as far as the geographer is concerned, perhaps the most interesting is that of the civilization of the past as compared with that of the present. To-day, in spite of the slowness and inefficiency of the inhabitants as compared with European races, the country compares most favorably with other tropical lands. Indeed it is so wealthy that some travelers have supposed Merida to be the richest city in the world in proportion to its

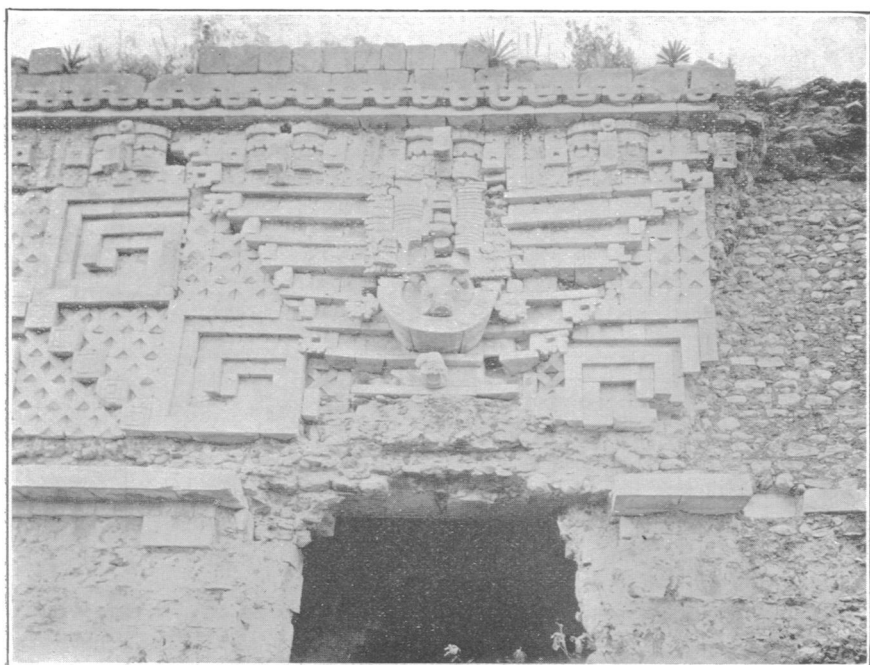


FIG. 10—Detail of the walls of a ruin at Kabah.

size. Whether this be true or not there can be no doubt that the country is rich, and that signs of poverty are hard to find. Possibly this apparent prosperity is partly due to the excessive neatness of the people, for neatness is in most countries the luxury of the well-to-do. Perhaps, too, their neatness in itself is a help against poverty. However that may be, there is at the present time a distinct and special reason why Yucatan has an extraordinarily prosperous air, and impresses the casual traveler as quite different from most tropical countries. This reason is the henequen or sisal fiber

industry. Henequen, as is well known, is a species of yucca which grows well in the relatively dry portions of Yucatan. The fiber is the strongest and most durable known, its only rival being Manila hemp. The growth of the demand for strong fibers, occasioned especially by the expansion of the grain fields in America and elsewhere, has for many years tended to increase the value of henequen, and has led to the planting of many square miles of the yucca in long, monotonous rows extending across the hilly plain between uncompromisingly angular stone walls. This, too, has led to the



FIG. 11.—The henequen or sisal plant.

building of a large number of narrow-gauge railroads in the dry northern part of Yucatan, and to the construction of hundreds of miles of diminutive tram lines leading off from the railroad stations to the larger henequen "finca." At the time of the Spanish War in 1898 the supply of Manila hemp was cut off for a few years and the price of henequen began to soar. Now it has fallen a good deal, but the fiber is still a highly valuable export and makes the country much more prosperous than it could be without the aid of some such highly specialized product. The whole aspect of the country shows

this, for it is the cause not only of the abundant railroads and tram lines, the almost imposing houses at some of the estates, and the fine dwellings of Merida, but also of the excellent public buildings and finely paved streets which make such an impression upon the traveler when he first arrives.

'The prosperity of to-day is apparently but a slight incident compared with that of the past. The present prosperity is in danger of proving ephemeral. It will vanish if another equally good fiber should be discovered in places where it can be raised more cheaply than in Yucatan. Even if it should last, it is an extraneous matter. It is due to the demands of the United States and other countries, it is fostered by their steamship lines, and its benefits are chiefly reaped not by the Indians and Mestizoes, but by people of Spanish blood, many of whom have not been in the country more than a generation or two. In the past, on the contrary, Yucatan had a high and long-enduring civilization which arose indigenously. I know that many people think that the seeds of Yucatecan culture in the hoary past were derived from Egypt or China or some other part of the Old World. I make no attempt to controvert this view, although I think that it is far from proven. This much, however, will be admitted by all: the connection between the Old World and the New, if any ever existed, was brief and one might say almost accidental. There was quite surely no such thing as any prolonged intercourse whereby for centuries ideas and methods of thought and action were transferred across the water. Moreover, the wonderful ruins of Yucatan, those great temples which arouse one's admiration just as do the monuments of Egypt, are distinctly Yucatecan in style. Whatever may have been imported from other parts of the world had remained long in Yucatan and had been remodelled to fit the genius of the old American race before it became fixed in the great structures which now excite our wonder. Yucatecan ideas in art, Yucatecan methods of supplying water in a land where there is none on the surface, and Yucatecan peculiarities of religion and taste had become strongly developed. Therefore we must conclude that even if some race from abroad did originally come to the land,—which many of the best authorities deny,—they did not stagnate and deteriorate as seems to be the case with modern immigrants after a generation or two. They did not imbibe the tropical languor which ultimately seems to check progress unless there is a continual stimulus from without. They kept on working, and developing new ideas. They had the industry to make some of the world's finest ruins, fashioned of care-

fully hewn stones and ornamented with wonderful carvings. And they did it all without the aid of iron. To develop so far must have required centuries, and so we may safely say that Yucatan once stimulated its people to an activity of mind and body comparable to that of any part of the world. Were the people capable of stimulation because of something in the fiber of the original race, or was the stimulus due to something in their environment?

AMUNDSEN'S EXPEDITION TO THE SOUTH POLE*

The plan of the third *Fram* expedition was twofold: first, the attainment of the South Pole and, second, the exploration of the North Polar regions. This evening I have the honor to report to you on the accomplishment of the first part of this plan.

I can only mention briefly here the expeditions which have worked in the region which we had selected for our starting point. As we wished to reach the South Pole our first problem was to go south as far as possible with our ship and there establish our station. Even so, the sled journeys would be long enough. I knew that the English expedition would again choose their old winter quarters in McMurdo Sound, South Victoria Land, as their starting point. From newspaper report it was known that the Japanese had selected King Edward VII Land. In order to avoid these two expeditions we had to establish our station on the Great Ice Barrier as far as possible from the starting points of the two other expeditions.

The Great Ice Barrier, also called the Ross Barrier, lies between South Victoria Land and King Edward VII Land and has an extent of about 515 miles†. The first to reach this mighty ice formation was Sir James Clark Ross in 1841. He did not dare approach the great ice wall, 100 feet high, with his two sailing ships, the *Erebus* and the *Terror*, whose progress southward was impeded by this mighty obstacle. He examined the ice wall from a distance, however, as far as possible. His observations showed that the Barrier is not a continuous, abrupt ice wall, but is interrupted by bays and

* Lecture delivered in German by Roald Amundsen before the Berlin Geographical Society on Oct. 9, 1912. Translated and reprinted from the *Zeitschr. der Gesell. für Erdkunde zu Berlin*, 1912, No. 7, pp. 481-498.

† All values have been changed from the metric system to English equivalents.